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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,256	10/02/2006	Tim Campbell	74837	9652
35973 7590 02/24/2009 BINGHAM MCHALE LLP 2700 MARKET TOWER 10 WEST MARKET STREET INDIANAPOLIS, IN 46204-4900				
EXAMINER TAKEUCHI, YOSHITOSHI				
ART UNIT 1793		PAPER NUMBER		
NOTIFICATION DATE 02/24/2009		DELIVERY MODE ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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# Office Action Summary

**Application No.**

10/568,256

**Applicant(s)**

CAMPBELL ET AL.

**Examiner**

YOSHITOSHI TAKEUCHI

**Art Unit**

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 February 2006.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-33 is/are pending in the application.  
4a) Of the above claim(s) 26-28 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-25 and 29-33 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 13 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO/SB/US)  
Paper No(s)/Mail Date 4-29-2008, 2-6-2008, 8-14-2007, 2-13-2006  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_



**DETAILED ACTION**

***Election/Restrictions***

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

- I. Claims 1-25, 29-33, drawn to a method for manufacturing a centrifugal compressor using an aluminum alloy, classified in class 148, subclass 549.
  - II. Claims 26-28, drawn to a method for manufacturing an object using a nickel-based alloy, classified in class 148, subclass 555.
2. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Group I claims a compressor part made of an aluminum-based alloy, whereas Group II claims a general object made of a nickel-based alloy. The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

**Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.**

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

3. During a telephone conversation with Mr. John Daniluck on February 10, 2009, a provisional election was made with traverse to prosecute the invention of Group I, claims 1-25 and 31-33. Affirmation of this election must be made by applicant in replying to this Office action. Claims 26-28 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1, 2, 5-21, 24, 25, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (J.R. Davis, Aluminum and Aluminum Alloys, 88-90-108-112, 309-311, 317-318, 328-330 (ASM International 1993)).

a. Regarding claim 1, 2 and 5-8, Davis teaches aluminum foundry alloys (p.89, Table 1 includes alloy 354) and specifies cooling to a cryogenic temperatures (p.318, as low as -195°C) delays the aging response (p.309-310). After the cooling step, Davis teaches heat treatment at 115-190°C for 5-48h (impliedly teaching both limitations of solution heat treatment and precipitation hardening. See MPEP § 2112) to precipitation harden the alloy (p.311). Additionally, Davis teaches thermal cycling the alloy (p.318), such that the alloy is heat treated both before and after cooling. The alloys can be subjected to hot isostatic pressing before said cooling in order to improve the fatigue life (p.108, Figure 8, and p.109). Davis teaches 3xx alloys have good machinability in an aged hardened temper, wherein machinability is dependent on alloy and temperature (p.330, Table 1b). Davis teaches the alloys can be cast into a variety of different shapes (p.88), but does not teach casting said alloy into a compressor wheel.

However, it is within the disclosure of Davis to cast said alloy into a compressor wheel mold or die. As a result, it would have been obvious to a person of ordinary skill at the time of the invention to use the process taught by Davis to form an aluminum compressor wheel since Davis suggests that the process can be used to cast a variety of

shapes, and the Davis is suitable for applications, such as compressor wheels, with high temperature and corrosive environments.

b. Regarding claims **9-12** and **15-19**, Davis teaches the method of claim 1 on aluminum foundry alloys (p.89, Table 1 includes alloy 354), and thermal cycling between cooling and heat treatment up to five cycles (p.318), such the alloy can be heat-treated both before and after cooling. Such heat treatment is at 115-190°C for 5-48h to precipitation harden the alloy (p.311) (impliedly teaching the limitations of “solution heat treatment,” “precipitation hardening,” annealing at a temperature less than about 145 degrees Centigrade” and “precipitation hardening at a temperature greater than about 145 degrees Centigrade.” See MPEP § 2112). Such cooling can be as low as -195°C (p.318), which is less than 150°C. The alloys can be subjected to hot isostatic pressing before said cooling in order to improve the fatigue life (p.108, Figure 8, and p.109).

c. Regarding claims **13-14** Davis teaches the method of claim 1, wherein cooling can be as low as -195°C (p.318) and also teaches quenching for periods of 1 week and longer (Figure 22, top, middle chart showing a logarithmic chart of elapsed quenching time v. tensile strength).

d. Regarding claims **20, 21, 24, 25**, Davis teaches a method for casting a variety of shapes (p.88) from aluminum foundry alloys (p.89 Table 1 includes 354 alloy, a castable aluminum containing with 8.6-9.4% Si). Davis specifies cooling to cryogenic temperatures as low as -195°C is possible to residual stress in order to permit fabrication of a part (p.318), followed by heat treatment at 115-190°C for 5-48h to precipitation harden the alloy (p.311).



c. Regarding claim **29** and **30**, Davis teaches the method of claim 20, wherein aluminum foundry alloys can be cast into a variety of different shapes (p.88-89), but does not teach casting said alloy into a compressor wheel.

However, it is within the disclosure of Davis to cast said alloy into a compressor wheel mold or die. As a result, it would have been obvious to a person of ordinary skill at the time of the invention to use the process taught by Davis to form an aluminum compressor wheel since Davis suggests that the process can be used to cast a variety of shapes, and the Davis is suitable for applications, such as compressor wheels, with high temperature and corrosive environments.

9. Claims **3** and **22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (J.R. Davis, Aluminum and Aluminum Alloys, 88-90-108-112, 309-311, 317-318, 328-330 (ASM International 1993)) in view of Hashimoto et al (JP354033815A).

Davis teaches the methods of claims 1 and 20, but does not teach said 3xx Al-Si casting alloy contains Li.

Hashimoto teaches an aluminum alloy for use in casting that has excellent tensile strength, elongation and castability at ordinary and high temperatures. Hashimoto teaches 0.02-0.2% Li can be added to Al-Si-Cu casting alloys with 5.0-13% Si and 2.0-5.0% Cu (page 89, column 2).

As a result, it would have been obvious to add Li to the 3xx series alloys taught by Davis because Hashimoto teaches said addition is useful for providing high tensile strength Al-Si alloys such as those taught by Davis.

10. Claims **4** and **23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (J.R. Davis, Aluminum and Aluminum Alloys, 88-90-108-112, 309-311, 317-318, 328-330 (ASM International 1993)) in view of Scott et al (US 4,975,243).

Davis teaches the methods of claims 1 and 20, but does not teach said 3xx Al-Si casting alloy contains Sc.

Scott teaches an aluminum alloy suitable for high temperature applications. Scott teaches that up to 0.3% Sc (column 2, line 1) can be added to Al-Si casting alloys in order to provide grain refinement and increasing strength (column 2, lines 17-22).

As a result, it would have been obvious to add Sc to the 3xx series alloys taught by Davis because Scott teaches said addition is useful for providing a grain refined and high tensile strength Al-Si alloys taught by Davis.

11. Claims **31-33** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto et al (JP354033815A).

Hashimoto teaches a castable aluminum alloy composition comprising from 2-5% Cu, 5-13% Si, 0.02-0.2% Li, balance aluminum (columns 1 and 2), which overlaps the presently claimed alloying ranges.

Since the claimed composition ranges of the instant claim either overlap or are within the ranges disclosed by Hashimoto, a prima facie case of obviousness exists. See MPEP § 2144.05. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to select the claimed aluminum alloy composition from the aluminum alloy composition disclosed by Hashimoto because Hashimoto teaches the same utility (i.e. aluminum for use in castings) in the whole disclosed range.

***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to YOSHITOSHI TAKEUCHI whose telephone number is (571) 270-5828. The examiner can normally be reached on Monday-Thursday 9:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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1793

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